

**Japanese Published Unexamined Patent Application (A) No. 04-154573, published May 27 1992; Application Filing No. 02-272292, filed October 12, 1990;**  
**Inventor(s): Tokio Onoda; Assignee: Asahi Chemical Engineering, Inc.; Japanese**  
**Title: Wrappers for Food**

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## **WRAPPERS FOR FOOD**

### **CLAIM(S)**

**A food wrapper made of porous hydrophobic sheet having 1 - 200 seconds/100 cc of Garley permeability and 500 - 3,000 mm H<sub>2</sub>O of water pressure resistance.**

### **DETAILED DESCRIPTION OF THE INVENTION**

#### **(Field of Industrial Application)**

**The present invention pertains to a wrapper for wrapping buns and dumplings at a time of steaming them.**

#### **(Prior Art)**

**When buns with bean paste and dumplings are steamed, water is first put in a steamer, a middle plate is placed at a few centimeters above water, food is placed on the middle plate in the steamer when water is being boiled, and dish cloth is applied to the inside of the cover to prevent the water droplets from falling to the food.**

**With this conditions, however, the water droplets cannot be completely prevented from falling, so the food looks bad for its top surface layer being shrunken and does not expand well after having been steamed.**

**On the other hand, if it is heated in a microwave oven, it will be put in a container and covered with a polychloride vinylidene sheet. At this time, water droplets are generated on the inner surface of the sheet, or the sheet is broken, which is a problem.**

**There also is a heating method, whereby a wrapped food with a polyethylene sheet wrapper or paper is directly put in boiling water. But, in such a case, a water content in the food evaporates inside the polyethylene sheet which is not air-permeable, breaking the polyethylene sheet. In the case of paper wrapper, water penetrates making the food soggy.**

**(Problems of the Prior Art to Be Addressed)**

**The present invention, to solve the aforementioned problems, attempt to present a thin, strong, porous, and hydrophobic food wrapper that can prevent buns from getting soggy while making them fluffy when steaming.**

**(Means to Solve the Problems)**

**The objective of the present invention can be achieved by using a porous hydrophobic sheet with Garley permeability 1 - 200 second/100 cc and water pressure resistance 500 - 3,000 mm H<sub>2</sub>O for the material of the wrapper.**

**The present invention is explained below in detail.**

**The porous hydrophobic sheet can be used for part of a wrapper or for an entire wrapper but is preferably used for an entire wrapper to improve the finished**

state of food after steaming and to improve the strength of the sheet.

The food wrapper in this context can be anything as long as it is a bag the four sides of which can be heat-sealed or bonded with an adhesive.

This porous hydrophobic sheet is manufactured by a conventionally well-known technique. For example, it is non-woven cloth (including permeable non-woven cloth wherein each fiber is self-fused to each other) made of 3-D mesh fiber manufactured by flash-spin method, melt-blow method, or by a paper manufacturing method or a micro porous film made by an extraction method for extracting an inorganic filler from a high polymer film or by an elution method for eluting mixed soluble particles.

As for the material, polyolefin noted for its hydrophobic property (polyethylene, polypropylene, and their copolymer), polyethylene terephthalate, and polyamide can be cited.

The porous hydrophobic sheet needs to have 1-200 second/100 cc, preferably, 10 - 150 seconds/100 cc of Garley permeability and 500 - 3,000, preferably, 800-2,900 mm H<sub>2</sub>O of water pressure resistance.

The inventors, as a result of studying how to reduce the stickiness, operability, and convenience when steaming, produced the present invention. They found that when a bean bun is wrapped with a porous hydrophobic sheet having 1 - 200 seconds/100 cc of Garley permeability and 500-3,000 mm H<sub>2</sub>O of water pressure

**resistance, the bun is not cracked in the surface and not soggy but is steamed into a fluffy bun.**

**Also, it was not necessary to use a middle plate or apply cloth to the inner surface of the lid. When the bun was put in a microwave oven, it was not soggy but turned out to be fluffy.**

**In the present invention, if the Garley permeability of the wrapper exceeds 200 seconds/100 cc and the water pressure resistance exceeds 3,000 mm H<sub>2</sub>O, the steam coming into the wrapper is reduced, so the longer steaming time is required. If Garley permeability is less than 1 second/100 cc and the water pressure resistance is less than 500 mm H<sub>2</sub>O, the boiled water will penetrate, making the bun too sticky and less fluffy.**

**(Embodiment Example)**

**The present invention is explained below in detail, but the invention is not limited to the following example.**

**The characteristic values and definitions and their measuring method are shown in the table below.**

**1) permeability: Determined by JIS-P-8117B**

**2) water pressure resistance: Determined by JIS-L1092B**

**3) thickness: Measured by applying 2.24 g of pressure to XS-4 adaptor (pressure-contact surface 8 mm  $\phi$  and weight 120 g) by using Peacock direct current type**

**digital linear gage PD-2 type (manufactured by Ozaki Manufacturing, Inc.).**

**(Embodiment Example 1)**

**A porous hydrophobic sheet was made by the method introduced in Japanese Unexamined Patent Application 01-132856 and in 01-132857.**

**This polyethylene 3-D mesh non-woven cloth ("Lukusaa H-2080" made by Asahi Chemical Engineering, Inc.) with a 20 cm horizontal length and a 40 cm vertical length was folded into a 20 x 20 cm size and heat-sealed on two sides. Subsequently, a bean bun made by Nakamuraya Co. was put inside and heat-sealed to prepare the wrapped bun (1) of the present invention.**

**Then, the water was put in a market purchased pan and brought to boil. The wrapped bun heat-sealed was put in the pan and covered with a lid for steaming for 10 minutes.**

**(Embodiment Example 2)**

**By using a market purchased Sekisui Pore (made by Sekisui Chemical Engineering. Its material is polypropylene NH-07H.), the wrapped bun (2) was prepared in the same manner as in embodiment example 1.**

**(Comparative Example 1)**

**A wrapped bun (3) as a comparative example was prepared by using Polypropylene Span Bond P5040 (made by Asahi Chemical Engineering, Inc.) in the same manner as in embodiment example 1.**

### (Comparative Example 2)

**A wrapped bun (4) as a comparative example was prepared by using a market purchased NFR sheet (120NW sheet made by Tokuyama Soda Co.) in the same manner as in embodiment example 1.**

### (Comparative Example 3)

**A bun without a wrapper was placed on a middle sheet after boiling the water in the steamer, and steamed for 10 minutes with a cover on the steamer.**

**The results is shown in Table 1.**

**Table 1**

	Types of wrappers	permeability (second/100 cc)	water pressure resistance mm H <sub>2</sub> O)	thickness (mm)	condition
embodiment example 1	wrapper 1	100	1,700	0.21	Not sticky but fluffy
embodiment example 2	wrapper 2	80	2,800	0.17	Same as above
comparative example 1	wrapper 3	11	200	0.20	Boiled water penetrated and the bun was sticky.
comparative example 2	wrapper 4	450	4,000	0.12	Not sticky but was hard inside.
comparative example 3	----	---	---	---	The condensed water dripped making the bun sticky.

**As shown in Table 1, the porous hydrophobic sheet having the parameters of the present invention exhibited an excellent effect.**

**On the other hand, with the comparative example 1 having permeability 1 second/100 cc or less and water pressure resistance 500 mm H<sub>2</sub>O or less, the boiled water penetrated and the bun got soggy. With the comparative example 2 with permeability 200 seconds/100 cc or higher and the water pressure resistance 3,000 mm H<sub>2</sub>O or higher, the steam hardly entered the wrapper and the bun was not soggy but was hard inside.**

**(Advantage)**

**A bun wrapped with a wrapper made of porous hydrophobic sheet of the present invention, as explained earlier, was not sticky but was fluffy. In addition, the wrapper was operable and convenient at a time of steaming. It was thin and strong, which is excellent as a food wrapper.**

**Translations**

**U. S. Patent and Trademark Office**

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**Akiko Smith**